Obstruent voicing, aspiration, and tone

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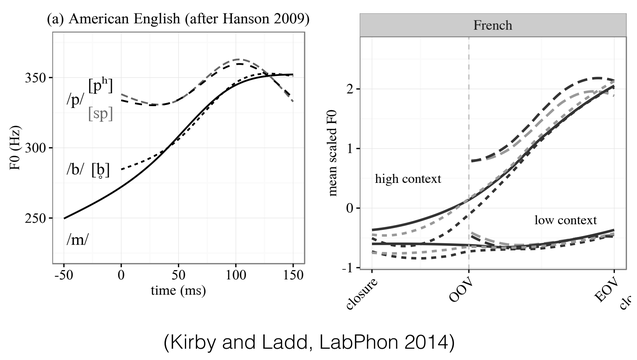
LabPhon 15
Cornell University
13-16 July 2016

INTRODUCTION

CF0: F0 of vowels is **higher** following **voiceless** stops

- Extensively investigated in languages with **2-way** contrasts (Lehiste and Peterson 1961, Kingston and Diehl 1994, Hanson 2009 etc.)
- What about languages with **3-way** contrasts (which tend to be tonal)?
- Previous studies on tonal languages are inconsistent, e.g.:



(Kirby and Ladd, LabPhon 2014)

	Study	Subj.	Methods	Results
Thai	Gandour (1974)	1 (M)	F0 @ "onset"	C > C^h
	Erickson (1976)	11 (6 F)	Avg. of "initial F0"	p^h > p (for 8)
	Shimizu (1994)	2 (M)	F0 @ "vowel onset"	C^h > C
Mandarin	Xu & Xu (2003)	7 (all F)	F0 @ 1st vocal cycle	t > t^h
	Lai et al. (2009)	10 (5 F)	F0 @ 10% incr.	C^h > C
Cantonese	Francis et al. (2006)	16 (8 F)	F0 @ 1st cycle + 10 ms	C > C^h

MATERIALS & METHODS

Khmer	Thai	Vietnamese
(Austroasiatic)	(Kra-Dai)	(Austroasiatic)
14 speakers (5 F)	12 speakers (6 F)	14 speakers (6 F)
Non-tonal	5 tones (F0)	6 tones (F0 + VQ)

da: ta: t^ha: la: na:

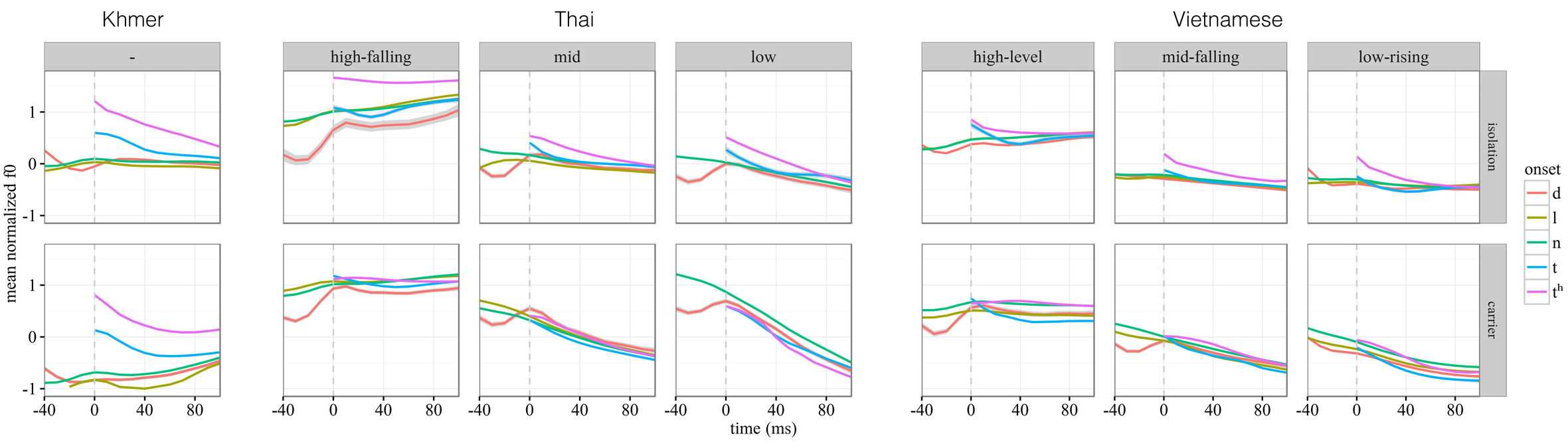
Khmer	Thai		Vietnamese	
/t^ha:/	ថ	/t^hâ:/	ถ่า	/t^ha:/	*tha*
		/t^há:/	ถา	/t^há:/	*thá*
		/t^hà:/	ทา	/t^hà:/	*thà*

- Single set of materials across all three languages
- Sonorants as reference level
- Isolation + carrier contexts
- Compare F0 with GAMs (Wood, 2006)

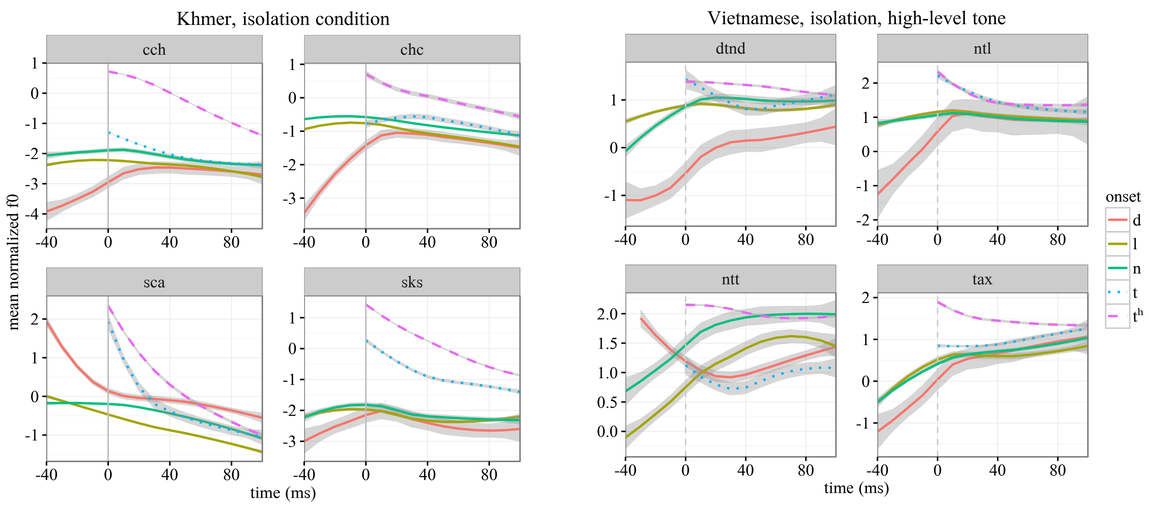
QUESTIONS

1. Do **both** C and C^h actually raise CF0?
2. Is attenuation the same in different tonal contexts?

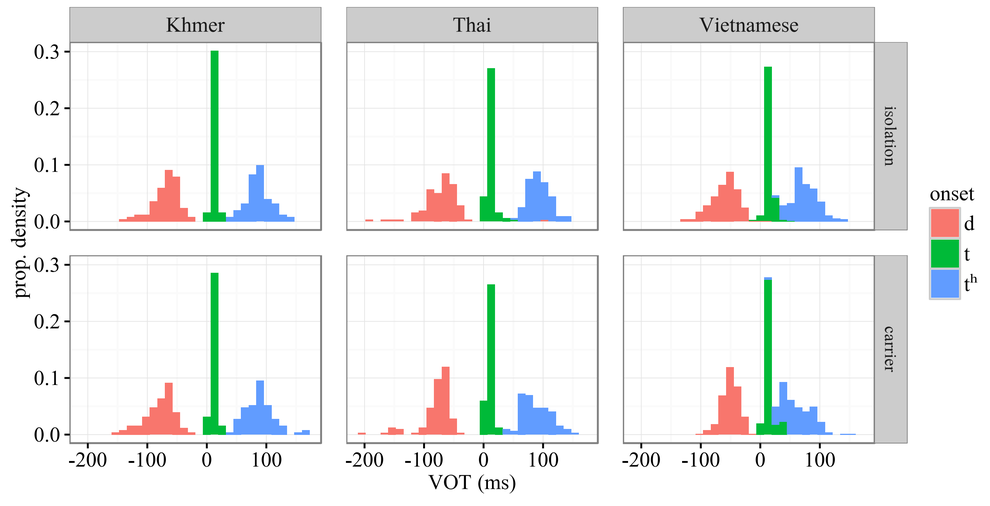
RESULTS



Individual differences



VOT distributions



DISCUSSION

- Further evidence that CF0 not related to VOT: language-/speaker-specific function of how/whether active devoicing is implemented (Kingston & Diehl, 1994; Hanson, 2009; Dmitrieva et al, 2015; etc)
- Tone *qua* tone tends to come from **finals**; CF0 primarily involved in conditioning tonal **splits.** If CF0 is actively suppressed, this is mysterious
- Alternative: with fewer tones, timing of laryngeal gestures determining tonal pitch targets may be less precise/more flexible, but with CF0 still prominent (cf. Lai et al., 2009)
- Aerodynamic component? (Kohler, 1985; Xu & Xu, 2003)

CONCLUSIONS

1. C^h **always** raises CF0, implying active devoicing
2. C **sometimes** raises CF0 (speaker/language-dependent)
3. There is no evidence of C > C^h for **any** speakers
4. CF0 is not universally attenuated in tone languages: language, context, and tone may all play a role

Research assistance Jasmine 良瑀 Sung

References *available upon request*